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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/900,779 | 07/06/2001 | Michael K. Brand | 12177/21101 | 7688 |

7590 09/12/2005

KENYON & KENYON
One Broadway
New York, NY 10004

EXAMINER

SHARON, AYAL I

ART UNIT

PAPER NUMBER

2123

DATE MAILED: 09/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|----------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/900,779 | BRAND ET AL. | |
| | Examiner Ayal I. Sharon | Art Unit 2123 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 8/15/05.
 2a) This action is **FINAL**. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-22 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1-22 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 21 May 2002 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. <u>8/16/05</u> . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____. | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

Introduction

1. Claims 1-13 and 15-22 of U.S. Application 09/900,779, originally filed on 7/6/2002 are presented for examination. Claim 14 was cancelled in the amendment filed on 4/11/2005. Claims 10 and 20 were cancelled in the amendment filed on 8/16/05.
2. Applicant's After-Final Amendment dated filed on 8/15/05 is entered into the record. However, Examiner has located relevant new prior art, and there prosecution has been reopened. This action is non-final.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 7 and 21 are rejected under 35 U.S.C. 101 because the claimed recitation of a use ("data determined at least in part from bill of materials (BOM) information"), without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966). There is no functional difference

between data obtained from BOM and data obtained experimentally – the difference is only one of intended use.

5. Claims 8, 9, 11, and claims 12-19 which depend from claim 11, are rejected under 35 U.S.C. 101 because the claimed recitation of a use (e.g. "during the design of the product", "prior to the manufacture of the product"), without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966). There is no functional difference between executing the Arrhenius Function during the product design stage and executing it after the design stage - the difference is only one of intended use.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
7. Claims 1, 21, and 22 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are the definitions of the variables used in the claimed equations.
8. Claims 7 and 22 provide for the use of "data determined at least in part from bill of materials (BOM) information", but, since the claim does not set forth any steps

involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

There is no functional difference between data obtained from BOM and data obtained experimentally – the difference is only one of intended use.

9. Claims 8, 9, 11, and claims 12-19 which depend from claim 11, provide for the timing of the use of the claimed invention (e.g. "during the design of the product", "prior to the manufacture of the product") but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced. There is no functional difference between data obtained from BOM and data obtained experimentally – the difference is only one of intended use.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The prior art used for these rejections is as follows:

12. Siegel, B. "Reliability and the Electronic Engineer". Intersil Corporation

Application Note AN1104. March 24, 1998. (Henceforth referred to as "Siegel").

13. Weibull.com. "Arrhenius Relationship Introduction." Printed from the 4/23/2001 archived version of the Weibull.com web site stored at Archive.org. (Henceforth referred to as "Weibull")

14. Reliasoft's ALTA 1.0 On-Site Training Guide. © 1999. (Henceforth referred to as "Reliasoft")

15. The claim rejections are hereby summarized for Applicant's convenience. The detailed rejections follow.

16. Claims 1-6, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Siegel in view of Weibull and further in view of Reliasoft.

17. In regards to Claim 1, Siegel teaches the following limitations:

determining accelerated stress testing data for the product using the relationship $t_F = AF \times \exp(t_A)$, the accelerated stress testing data representing the response of the product operating in a first environment; and

(See Siegel, especially: Equations 1 and 2 on p.1)

calculating the mean-time-between-failures (MTBF) for the product operating in a second environment based on the accelerated stress testing data.

(See Siegel, especially: Equations 1 and 2 on p.1)

However, it is ambiguous whether the Arrhenius Relationship expression in Equation 1 of Siegel is exponential. The Weibull Reference (see p.1) clearly teaches that both the Arrhenius Reaction Rate Equation and the Arrhenius Stress-Life Relationship Equation are exponential.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Siegel with those of Weibull,

because the Arrhenius equation taught in Siegel is not completely clear as to whether it is exponential or not.

Moreover, Siegel does not expressly teach that the exponential relationship, otherwise known as the "Arrhenius relationship", is implemented in the form of computer-executable instructions, as claimed in the following limitations:

1. A machine-readable medium storing computer-executable instructions to perform a method of estimating a life of a product, the method comprising:

The Reliasoft reference, on the other hand, does teach the software implementation of the Arrhenius model (See Reliasoft, especially: pp.9, 11, 13, 15, 43, 44).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Siegel with those of Reliasoft, because Reliasoft teaches the automation of the process taught in Siegel.

18. In regards to Claim 2, Siegel teaches the following limitations:

2. The machine-readable medium of claim 1, wherein said first environment is more likely than the second environment to cause the product to fail.

(See Siegel, especially: Equations 1 and 2 on p.1)

19. In regards to Claim 3, Siegel teaches the following limitations:

3. The machine-readable medium of claim 1, wherein the accelerated stress testing data represents the length of time the product operates in the first environment before the product fails.

(See Siegel, especially: Equations 1 and 2 on p.1)

20. In regards to Claim 4, Siegel teaches the following limitations:

4. The machine-readable medium of claim 1, wherein the accelerated stress testing data is derived from a plurality of different stress tests.

(See Reliasoft, especially: p.34. The figure in the middle of the page shows several types of stress tests, including temperature and vibration)

21. In regards to Claim 5, Reliasoft teaches the following limitations:

5. The machine-readable medium of claim 4, wherein the plurality of different stress tests includes a temperature test and a vibrational test.

(See Reliasoft, especially: p.34. The figure in the middle of the page shows several types of stress tests, including temperature and vibration)

22. In regards to Claim 6, Siegel teaches the following limitations:

6. The machine-readable medium of claim 1, further comprising calculating upper and lower confidence limits for the MTBF calculation.

(See Siegel, especially: pp.26, 37, 43-45, and 52)

23. In regards to Claim 21, Siegel teaches the following limitations:

determining accelerated stress testing data for the product using the relationship $t_F = AF \times \exp(t_A)$, the accelerated stress testing data representing the response of the product operating in a first environment; and

(See Siegel, especially: Equations 1 and 2 on p.1)

calculating the mean-time-between-failures (MTBF) for the product operating in a second environment based on the accelerated stress testing data.

(See Siegel, especially: Equations 1 and 2 on p.1)

wherein said first environment is more likely than the second environment to cause the product to fail; and

(See Siegel, especially: Equations 1 and 2 on p.1)

However, it is ambiguous whether the Arrhenius Relationship expression in Equation 1 of Siegel is exponential. The Weibull Reference (see p.1) clearly teaches that both the Arrhenius Reaction Rate Equation and the Arrhenius Stress-Life Relationship Equation are exponential.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Siegel with those of Weibull, because the Arrhenius equation taught in Siegel is not completely clear as to whether it is exponential or not.

Moreover, Siegel does not expressly teach that the exponential relationship, otherwise known as the "Arrhenius relationship", is implemented in the form of computer-executable instructions, as claimed in the following limitations:

21. A machine-readable medium storing computer-executable instructions to perform a method of estimating a life of a product, the method comprising:

Siegel also does not expressly teach the following limitation:

wherein the accelerated stress testing data is derived from a plurality of different stress tests.

The Reliasoft reference, on the other hand, does teach the software implementation of the Arrhenius model (See Reliasoft, especially: pp.9, 11, 13, 15, 43, 44). Reliasoft also teaches the use of a plurality of stress tests (See Reliasoft, especially: p.34. The figure in the middle of the page shows several types of stress tests, including temperature and vibration).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Siegel with those of Reliasoft, because Reliasoft teaches the automation of the process taught in Siegel.

24. In regards to Claim 22, Siegel teaches the following limitations:

determining accelerated stress testing data for the product using the relationship $t_F = AF \times \exp(t_A)$, the accelerated stress testing data representing the response of the product operating in a first environment; and

(See Siegel, especially: Equations 1 and 2 on p.1)

calculating the mean-time-between-failures (MTBF) for the product operating in a second environment based on the accelerated stress testing data.

(See Siegel, especially: Equations 1 and 2 on p.1)

wherein said first environment is more likely than the second environment to cause the product to fail; and

(See Siegel, especially: Equations 1 and 2 on p.1)

However, it is ambiguous whether the Arrhenius Relationship expression in Equation 1 of Siegel is exponential. The Weibull Reference (see p.1) clearly teaches that both the Arrhenius Reaction Rate Equation and the Arrhenius Stress-Life Relationship Equation are exponential.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Siegel with those of Weibull, because the Arrhenius equation taught in Siegel is not completely clear as to whether it is exponential or not.

Moreover, Siegel does not expressly teach that the exponential relationship, otherwise known as the "Arrhenius relationship", is implemented in the form of computer-executable instructions, as claimed in the following limitations:

22. A machine-readable medium storing computer-executable instructions to perform a method of estimating a life of a product, the method comprising:

The Reliasoft reference, on the other hand, does teach the software implementation of the Arrhenius model (See Reliasoft, especially: pp.9, 11, 13, 15, 43, 44).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Siegel with those of Reliasoft, because Reliasoft teaches the automation of the process taught in Siegel.

Finally, the references do not expressly teach the following limitation, which the Examiner finds to be an intended use:

wherein said accelerated stress testing data is determined at least in part from bill of materials (BOM) information on the product.

Response to Arguments

25. Applicant's Amendment filed on 8/16/05 overcomes the previously applied 35 U.S.C. §101 rejections. Those rejections have been withdrawn, however, new 101 rejections have been applied in this Office Action regarding different issues.

Conclusion

26. The following references are made of record, and are relevant to the instant application:
27. Shih, C., Lambertson, R., et al. "Characterization and Modeling of a Highly Reliable Metal-to-Metal Antifuse for High-Performance and High-Density Field-Programmable Gate Arrays." 1997 IEEE Int'l Reliability Physics Symposium (IRPS). April 8, 1997. (See the Arrhenius equation on Slide 16, and the graphs on slides 17-19).
28. Several Arrhenius and Accelerated Stress-Testing pages from the archived version of the Weibull web site.

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ayal I. Sharon whose telephone number is (571) 272-3714. The examiner can normally be reached on Monday through Thursday, and the first Friday of a biweek, 8:30 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard can be reached at (571) 272-3749.

Any response to this office action should be faxed to (703) 872-9306, or mailed to:

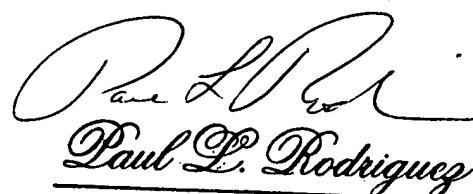
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Alexandria, VA 22314

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Tech Center 2100 Receptionist, whose telephone number is (571) 272-2100.

Ayal I. Sharon
Art Unit 2123
August 17, 2005


Paul L. Rodriguez 8/22/05
Primary Examiner
Art Unit 2125